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NOTES ON GEOGRAPHIC DISTRIBUTION

New records and geographic distribution map of *Triatoma petrocchiae* Pinto and Barreto, 1925 (Hemiptera: Reduviidae: Triatominae)

Lindemberg Caranha [1], Rodrigo Gurgel-Gonçalves [2], Rerilson Dias Ramalho [1] and Cleber Galvão [3*]

1 Secretaria Estadual de Saúde do Ceará, Coordenadoria de Proteção e Promoção a Saúde, Núcleo de Controle de Vetores, Laboratório de Entomologia Médica Dr. Thomaz Corrêa Aragão. Rua dos Tabajaras 268. CEP 60060-510. Fortaleza, CE, Brasil.
2 Universidade de Brasília, Faculdade de Medicina, Área de Patologia, Laboratório de Parasitologia Médica e Biologia de Vetores. Campus Universitário Darcy Ribeiro. CEP 70910-900. Brasília, DF, Brasil.
3 Fundação Oswaldo Cruz, Instituto Oswaldo Cruz, Laboratório Nacional e Internacional de Referência em Taxonomia de Triatomíneos. Avenida Brasil 4365. CEP 21040-900. Rio de Janeiro, RJ, Brasil.
* Corresponding author. E-mail: *galvao@ioc.fiocruz.br*

ABSTRACT: *Triatoma petrocchiae* (Hemiptera, Reduviidae, Triatominae) is reported from two localities in southeastern Ceará, Brazil. This represents the first record of the species in the state of Ceará, thus extending its known distribution. A distribution map was produced using the Maxent Method to update and predict its potential geographic distribution in Brazil.

Triatominae is a subfamily of reduviid insects with many species acting as vectors of *Trypanosoma cruzi*, the etiologic agent of Chagas disease or American trypanosomiasis. The subfamily currently contains 141 species, grouped into 18 genera and five tribes (Galvão *et al*. 2003; Schofield and Galvão 2009). The majority of species are found in the Neotropical and southern Nearctic regions and the Antilles. In Brazil there are 62 recognized species of Triatominae. *Triatoma petrocchiae* (Figure 1) is a sylvatic triatomine species limited to Northeast Brazil. It has been found only in xeric habitats, sometimes in rodent burrows such as that of *Kerodon rupestris* Wied, 1820. This species is similar to *T. brasiliensis,* an important vector of Chagas disease in Northeast Brazil, to which it is morphologically closely related. In addition to its very long head, *T. petrocchiae* differs from *T. brasiliensis* by such characters as the relatively very short first antennal segment, the practically glabrous rostrum, and the absence of spongy fossulae in both males and females. Although both species have been found sympatrically, they are mutually sterile (Lent and Wygodzinsky 1979). The Brazilian states with records of this species are Bahia, Paraíba, Pernambuco, and Rio Grande do Norte (Lent and Wygodzinsky 1979; Galvão *et al.* 2003). Herein, we report a new Brazilian state record of *T. petrocchiae* in the state of Ceará, update its geographic distribution map, and predict its potential geographic distribution in Brazil.

In May 2010, during routine sampling conducted by the *Chagas Disease Control Program* triatomines were collected manually by the agents of endemic diseases. The materials used for triatomine collection were metal tweezers and flashlights to inspect cracks and sites deprived of light and, when necessary, dislodging liquid (Pirisa 2%) was applied. Two specimens were collected in the municipalities of Ipaumirim (6°47'23" S, 38°43'09" W.) and Baixio (6°43'48" S, 38°43'01" W.), both located in southeastern Ceará state (Figure 2). The climate in this region is tropical, hot, and semi-arid, with annual rainfall of 704 mm (Ipaumirim) and 741.5 mm (Baixio). The predominant vegetation is *Caatinga* (Deciduous Thorny Forest), the largest dry forest region in South America, ranging from low shrubby Caatinga associated with shallow sandy soils to tall Caatinga forest associated with eutrophic soils. This vegetation is typical of Northeast Brazil, defined as a combination of thorny bushes and trees with small leaves. The specimens are preserved in the Laboratório de Entomologia Médica Dr. Thomaz Corrêa Aragão, Fortaleza, Ceará.

The updated geographic distribution map of *T. petrocchiae* (Figure 2) presents the known records in the

FIGURE 1. *Triatoma petrocchiae* specimen (female) from municipality of Ipaumirim, state of Ceará, Brazil.

states of Bahia, Paraíba, Pernambuco, and Rio Grande do Norte (Lent and Wygodzinsky 1979; Galvão *et al.* 2003), plus the new records from the state of Ceará. These points were used to predict the potential distribution of this species in Brazil using the ecological niche modeling (ENM) approach. ENM uses the associations between environmental variables and known species occurrence sites to define the environmental conditions where populations of a given taxon may be maintained (Guisan and Thuiller 2005). We used the maximum entropy method as implemented in Maxent v3.2.1 (Phillips *et al.* 2006), using default parameter values to generate predictive distribution models based on known occurrence points and the values recorded at those points for each of 21 environmental variables. The models generated by Maxent were imported into ARC VIEW (version 3.2) to create and edit the potential distribution maps. Environmental variables were extracted from the WorldClim dataset (Hijmans et *al.* 2005); we selected variables related to three principal traits: temperature, precipitation, and topography (see details in Gurgel-Gonçalves *et al.* 2011).

The ecological niche model (Figure 2) indicates that *T. petrocchiae* should occur widely in Northeast Brazil in the Caatinga ecoregion. The potential distribution map included all known points of occurrence and indicated that *T. petrocchiae* occurs not only in northern Ceará but also in the states of Piauí, Alagoas, and Sergipe, where the species has not been recorded to date. Future sampling in these areas should be performed to confirm the distribution model. The occurrence of native triatomine species that sporadically invade human dwellings is a major difficulty for the vector surveillance programs. Knowledge of geographic distribution and natural infection are fundamental to the understanding of epidemiological aspects related to the *T. cruzi* transmission and should be considered to guide the actions of control and surveillance of Chagas disease. Future studies may clarify ecological and biological potential of *T. petrocchiae* in the transmission of *T. cruzi*.

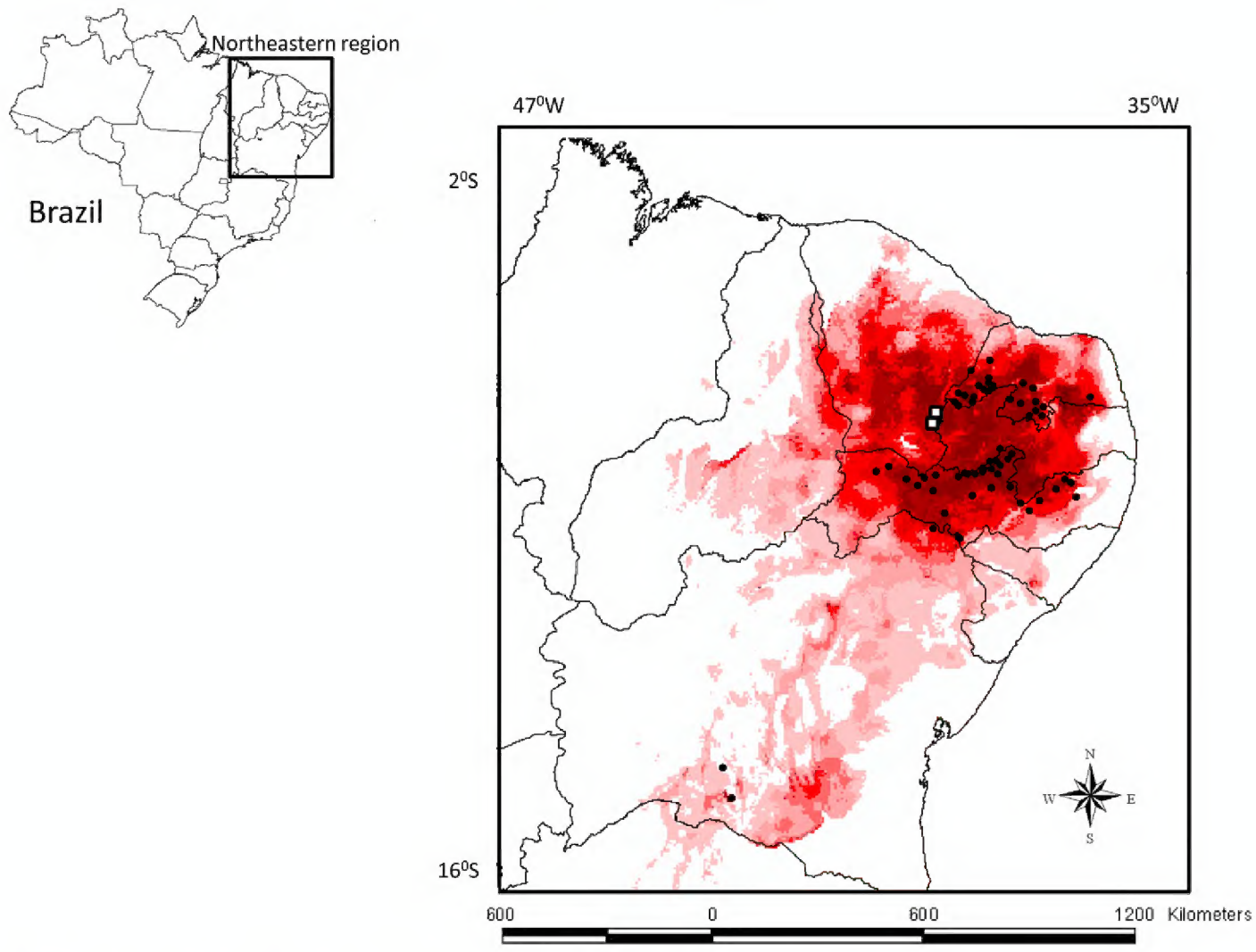

Figure 2. Geographic distribution of *Triatoma petrocchiae* in Brazil. Circles represent the known records for this species in the states of Bahia, Paraíba, Pernambuco, and Rio Grande do Norte. Squares represent the new records from the state of Ceará. The potential distribution map based on ecological niche modeling (Maxent method) is shown in redscale. Maxent produces a continuous prediction with values ranging from 0 to 100, and the blank area represents the predicted absence by the models. The red ramp area represents the low (pale red) and high (dark red) probability distribution values.

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